

ARM Updates

ARM-ASR Joint User Facility & PI Meeting

June 11, 2019

Sally McFarlane

Rick Petty

ARM Program Managers

Infrastructure Management Board Changes



- Stephen Springston, BNL
 - IMB member, 2016-2018
 - Measurements representative



- Kim Nitschke, LANL
 - IMB member, 2011-2018
 - AMF/ENA Site Manager

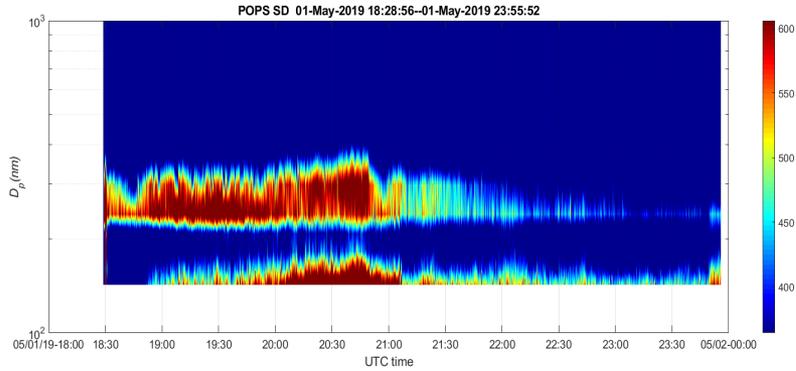


- Adam Theisen, ANL
 - New IMB member
 - Instrument Operations manager

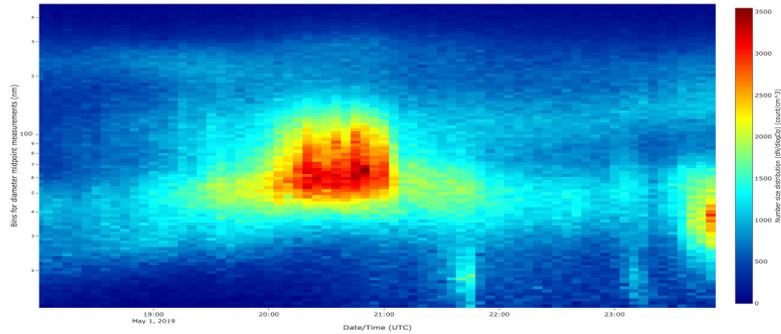


- Heath Powers, LANL
 - New IMB member
 - AMF1, AMF2, ENA site manager

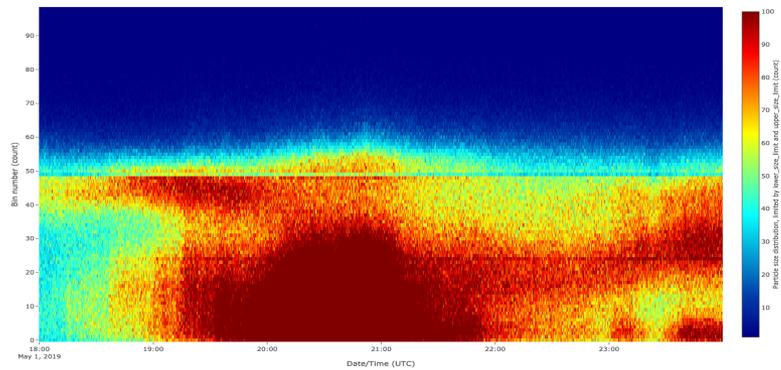
Tethered balloon activities – SGP April 2019



Plot of sgpaosmpsE13.a1 number_size_distribution for 20190501.180024-20190501.235246



Plot of sgpaosuhsasE13.a1 size_distribution for 20190501.175948-20190501.235949



- Initial flights of the TBS were conducted at SGP for 17 hours from 4/25/19 - 5/1/19.
- SGP TBS flights may be conducted during daylight as high as 1 km AGL and must remain 150 m below cloud base.
- Aerosol instrumentation (two POPS and one CPC), anemometers, radiosondes, and distributed temperature sensing (DTS) optical fiber were deployed.



Images from Dari Dexheimer & Fan Mei

Future TBS Activities

- 2.5 weeks of flights at SGP in July 2019
- Balloon-borne, Transverse Electromagnetic Measurement (BTEM): Determine the profile of electrical resistivity (PI: Robert Grimm)
- Vertically-Resolved New Particle Formation and Transport Study (VNATS): Develop process-level understanding for the formation and growth of atmospheric aerosol aloft (PI: Chongai Kuang)
- Initial flights of TBS aerosol filter samplers to determine the minimum flight time required for sufficient sample collection
- August 2019 flights at the AMF3 in Oliktok Point
- Late Sep – Oct 2019 flights at SGP
- ARM is currently planning TBS deployments in FY20 and will issue a TBS activities call in the next few months.



BTEM prototype flight at SGP in April 2019

Arctic shark

- Integration of scientific instruments
 - VectorNav (Position, Attitude)
 - AIMMS-30 (Meteorology)
 - CDP (Cloud Droplet Sizes)
 - RedEdge Camera (multispectral images)
 - POPS (Aerosol Size Distribution)
 - ACCESS (Aerosol composition, number, size, absorption)
 - Designing community inlet
- Test flights at Pendleton, OR UAS Range
 - Demonstrated safe operation mixed in with commercial and general aviation traffic
 - ADS-B in and out; onboard radios for communication with ATC and Visual Observers
 - Test flight up to 9500 ft msl
 - Plan to extend range with staggered visual observers
- SGP campaign delayed due to aircraft hardware issues; now planning for Fall 2019



ARM Manned Aircraft Status

- G-1 aircraft was retired after successful CACTI campaign Nov/Dec 2018
- PNNL leading the formal project management process for a replacement aircraft
 - Alternatives analysis – identified purchasing used aircraft as best option
 - ARM received full funding for replacement aircraft in FY2019 appropriation
 - Rigorous analysis of aircraft models; request for proposals for aircraft Jan 2019
 - Awarded contract for a Bombardier Challenger 850 aircraft in May 2019
 - Finalizing aircraft modifications statement of work – will require extensive modifications to be ready for atmospheric research
 - Aircraft expected to be ready for first research mission by 2022



New data products

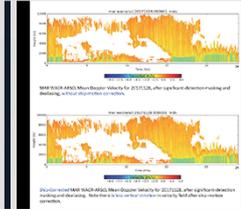
- ARM is continuously developing new data products, processing products for additional dates/sites, & improving data discovery
- Recent focus on data from AMF deployments
- Check ARM newsletter for 'Data Announcements'
- Provide input on data product priorities through Working Groups and Breakout Session reports
- Submit your own data as an ARM PI Data Product
- ARM Data Booth – in Lobby
 - Questions about how to get ARM data? Questions about ARM computing? Stop by during coffee breaks or break-out session times
- ARM Data Discovery – Wed lunch session

NEWS & EVENTS
DATA ANNOUNCEMENTS

WACR-ARSCL EVALUATION DATA AVAILABLE FOR MARCUS FIELD CAMPAIGN
Published: 20 May 2019
[Data Announcements](#)
Evaluation data for the W-Band ARM Cloud Radar-Active Remote Sensing of Clouds (WACR-ARSCL) value-added product are now available for the Measurements of Aerosols, Radiation, and Clouds over the Southern Ocean (MARCUS) field campaign.
[Read more](#)

RADIATION DATA QUALITY VAP EXPANDS TO LASIC FIELD CAMPAIGN SITE
Published: 19 March 2019
[Data Announcements](#)
A new release for the Data Quality Assessment for ARM Radiation Data (QCRAD) value-added product (VAP) covers the mobile deployment to Ascension Island for the Layered Atlantic Smoke Interactions with Clouds (LASIC) field campaign.
[Read more](#)

NEW MICROWAVE RADIOMETER RETRIEVALS VAP DATA AVAILABLE FOR SEVERAL ARM CAMPAIGNS AND SITES
Published: 20 February 2019
[Data Announcements](#)
The Microwave Radiometer Retrievals (MWRRET) value-added product (VAP) retrieves column precipitable water vapor and liquid water path from ARM's 2-channel microwave radiometers.
[Read more](#)



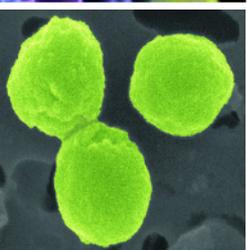
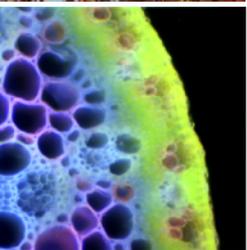
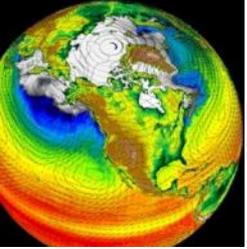
ARM Mobile Facility Workshop

- Workshop held summer 2018 to get input from the scientific community on the scientific objectives, research challenges, and opportunities for the ARM Mobile Facility (AMF) capabilities
- Co-chairs:
 - Rob Wood, University of Washington
 - Guang Zhang, Scripps/UCSD
 - Nicki Hickmon, Argonne
- Solicited input & white papers from research community
- 26 scientific attendees discussed high priority meteorological regimes or regions of scientific interest; improving coupling and integration of AMFs with models; increasing AMF impact
- Workshop report published April 2019



AMF3 Redeployment

- AMF3 designed as an “extended term” **mobile** facility
- Planned for ~5 year deployments
- Deployment at Oliktok Point became operational Sep 2013
- Extended AMF3 deployment through end of FY20 as part of BER commitment to MOSAIC and YOPP
- BER currently anticipates moving the AMF3 from Oliktok Point in FY21
- Some instruments will likely remain through spring FY21 to support planned activities
- Plan to deploy to a new site in the Southeast US; with operations beginning by Sep 2022
- More details & timelines to come



Field Campaigns

Campaign Proposal Process

- Small Campaigns
 - Pre-proposals accepted year-round
 - Reviewed & approved quarterly
 - Level of campaign determines need for proposal, type of review, decision timeline and start time after decision
 - Plan ahead for small campaigns!
 - Data submission & final report within 6 months of campaign end
- AMF/AAF Campaigns
 - Requests for AMFs and AAF competed through annual call
 - Timing of annual call has changed:
 - Call issued in Dec
 - Pre-applications in April
 - Full applications in Aug
 - Science Board review in late fall
 - <https://www.arm.gov/research/campaigns>

Sampling of small campaigns

- Water vapor campaigns at SGP
 - Micropulse Dial (MPD) Network Demonstration; PI - Tammy Weckwerth
 - Demonstration of a new water vapor radar; PI – Matt Lebsock
- Aerosol campaigns at SGP and NSA
 - Small particle growth and aging at SGP; PI – Don Collins; Sept 2019 – June 2020
 - POPSnet-SGP: A Pilot Aerosol Microphysical Network; PI: Allison McComiskey; Sep 2019 – Aug 2021
 - Aerosol ice-formation pilot closure study; PI - Daniel Knopf; Oct 2019
 - Examining the Ice-Nucleating Particles at the SGP; PI - Naruki Hiranuma; Oct 2019
 - Agricultural Ice Nuclei at SGP; PI – Susannah Burrows; June 2020 & April 2021
 - Biogenic Emissions and Aerosol Response on the North Slope; PI – Rebecca Sheesley; June 2019 – Aug 2020
 - Arctic Aerosol Sources & Mixing States; PI – Kerry Pratt; Oct 2018 - 2020
- Other
 - Snow Albedo Evolution (NSA); PI – Matthew Sturm; May 2019 – June 2021
 - Atmospheric Electric Field Mill Sensor (ENA); PI – Hugo Silva; 2014 - 2019

Recently Completed Campaigns

- CACTI (Cloud, Aerosol, and Complex Terrain Interactions)
 - PI Adam Varble, U. Utah
 - AMF1 deployed to north-central Argentina - Aug 2018 – Apr 2019; G-1 Nov-Dec, 2018
 - Coordinated with NSF RELAMPAGO campaign
 - Improve understanding of cloud lifecycle and organization in relation to environmental conditions in order to improve cumulus, microphysics, and aerosol parameterizations
 - **Breakout session yesterday**
 - **Plenary presentation Thursday morning**



Upcoming campaigns (1)

- MOSAiC Atmosphere

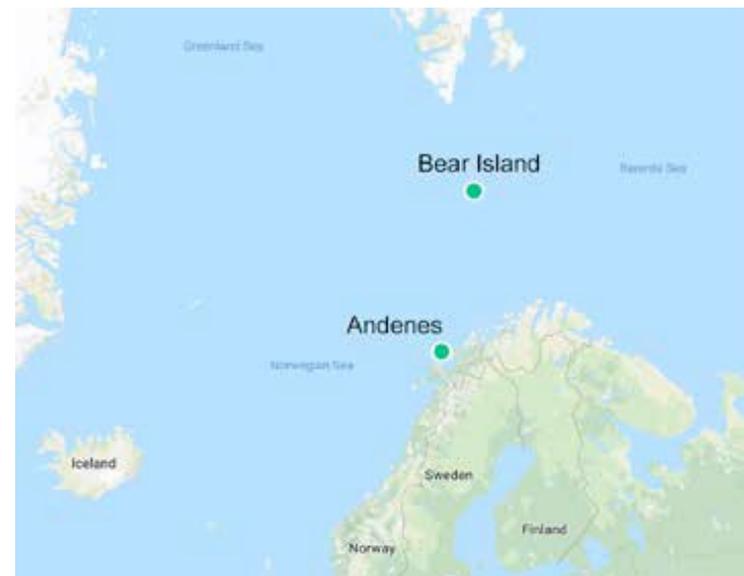
- PI Matt Shupe, U. Colorado/NOAA
- AMF2 to deploy on *Polarstern* icebreaker, which will be frozen into and drift with Central Arctic sea-ice for 1 year; Sep 2019 – Oct 2020
- Target atmosphere and atmosphere-surface interactions that are critically under-observed in the Arctic and are leading contributors to model uncertainties in the region



Polarstern
Alfred Wegner Institute

- COMBLE (Cold-air Outbreaks in the Marine Boundary Layer Experiment)

- PI Bart Geerts, U. Wyoming
- AMF1 deploying to Andenes, Norway; supplemental measurements on Bear Island in the N. Atlantic
- January to May 2020
- Goal: quantify the properties of boundary layer convection and air-mass transformations in cold-air outbreaks over open water in the Arctic
- **Joint breakout session Wed afternoon**



Upcoming campaigns (2)

- TRACER (Tracking Convection Interactions Experiment)
 - PI: Mike Jensen, Brookhaven National Lab
 - AMF1 and C-SAPR2 to Houston, TX area to study aerosol-cloud interactions in deep convection
 - Houston offers unique environment where isolated convective systems are common and experience a spectrum of aerosol conditions from
 - April 2021 – April 2022; with an intensive operational period in summer 2021
 - ARM call for guest instrument deployments forthcoming later this summer/fall
- **Breakout session Wednesday morning**

